

DRAM: **Technology for Every Platform**

Hidemori Inukai
Vice President, General Manager
Technical Marketing Division
Elpida Memory, Inc.



San Jose January 23-24, 2001 • Taipei February 14-15, 2001

Who is Elpida ...

**NEC (DRAM) +
Hitachi (DRAM) =**

Elpida

● **Rich heritage from parent companies:**

- *Advanced DRAM process technology*
- *Investment in R&D and capital equipment*
- *Quality, reliability, dependability of products*

● **New company qualities:**

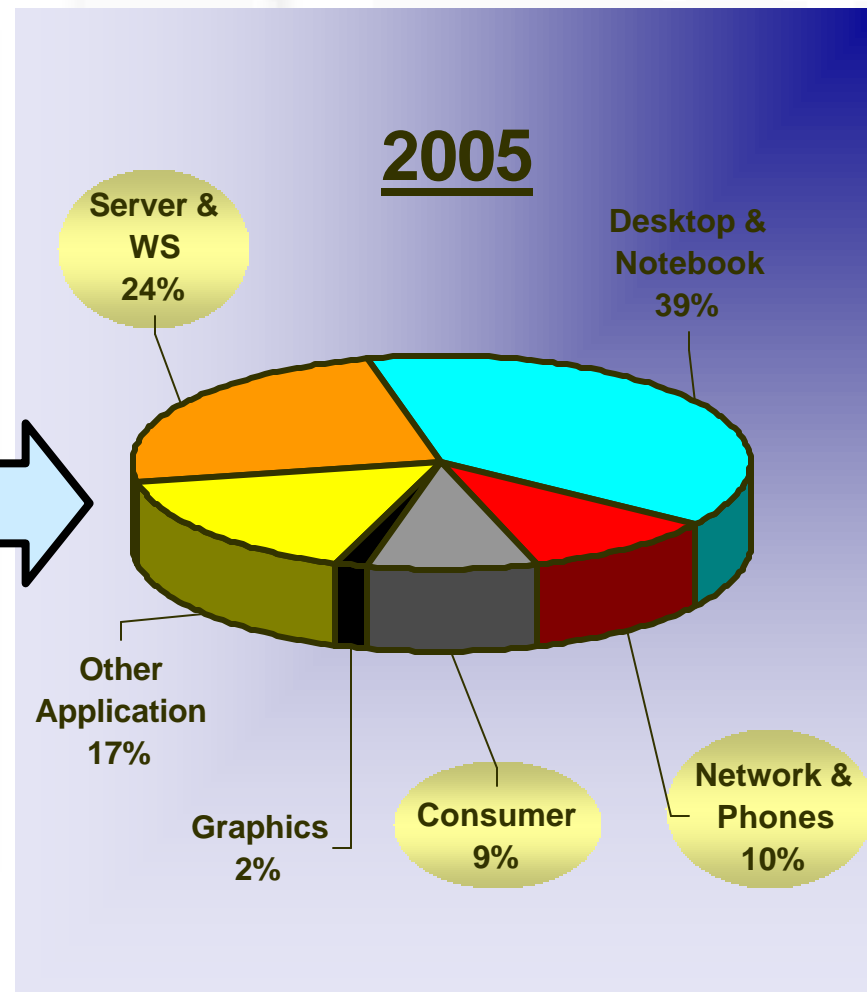
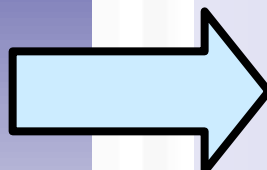
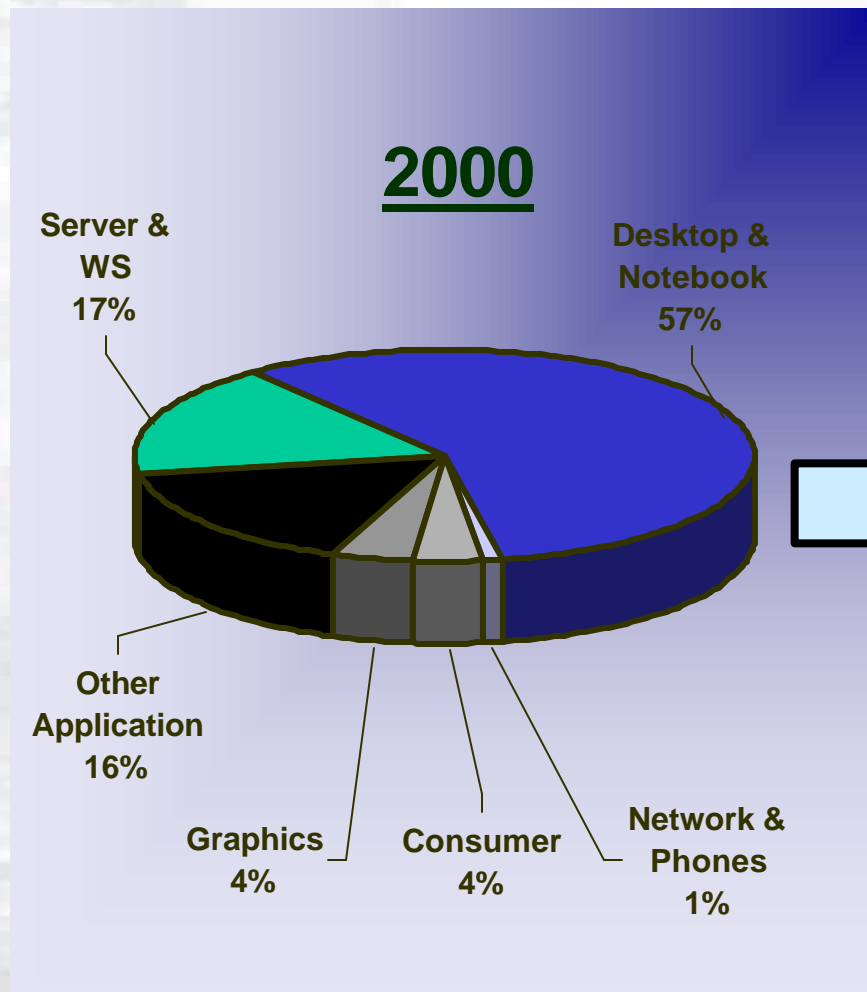
- *Completely dedicated to DRAM, faster shrinks*
- *Support for all major architectures: SDR/DDR/Rambus*
- *Combined resources for technology innovation and larger market presence*

This is the power of focus!

DRAM Market and Technology

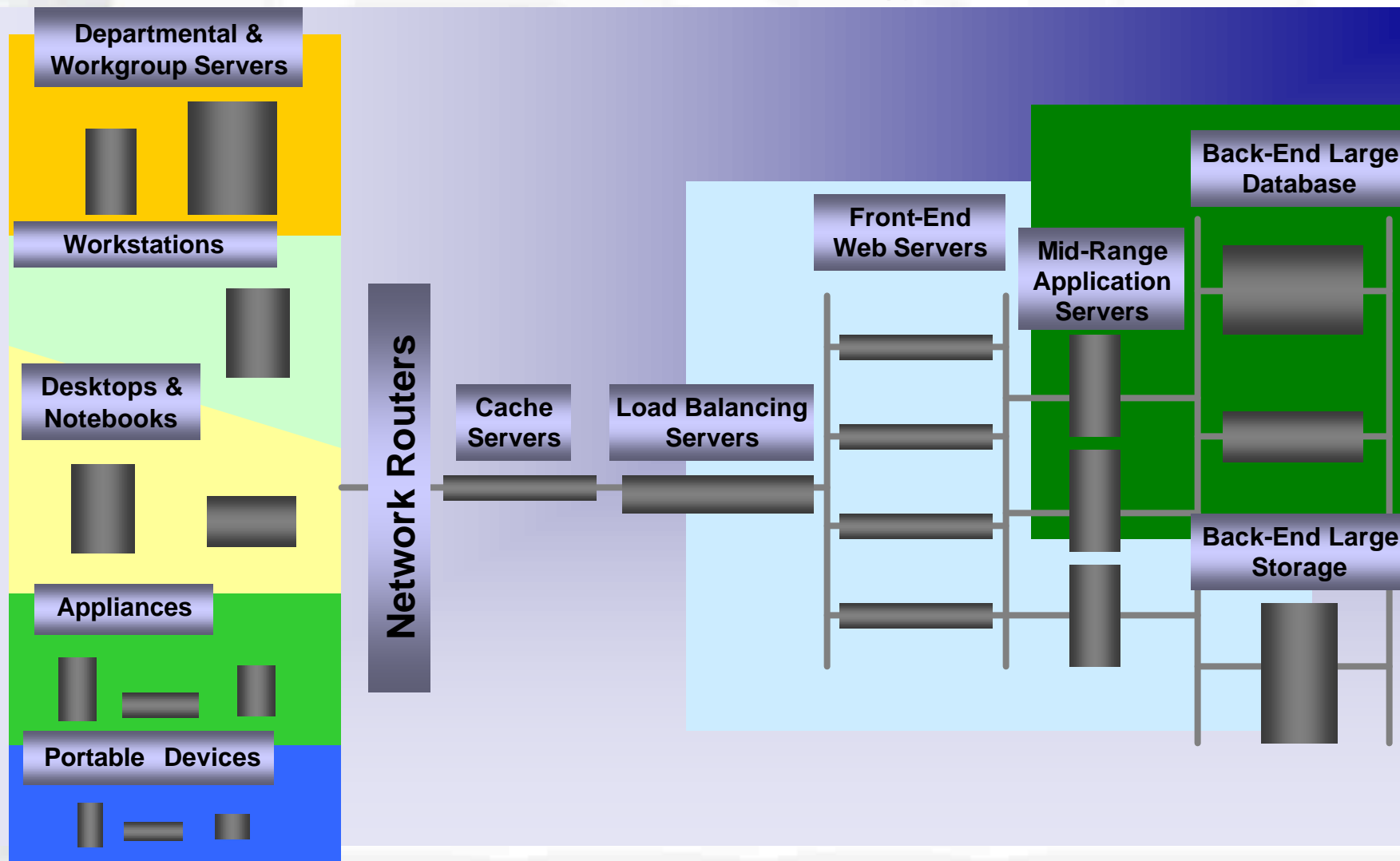
DRAM Market Segments

Forecasting a Changing DRAM Market

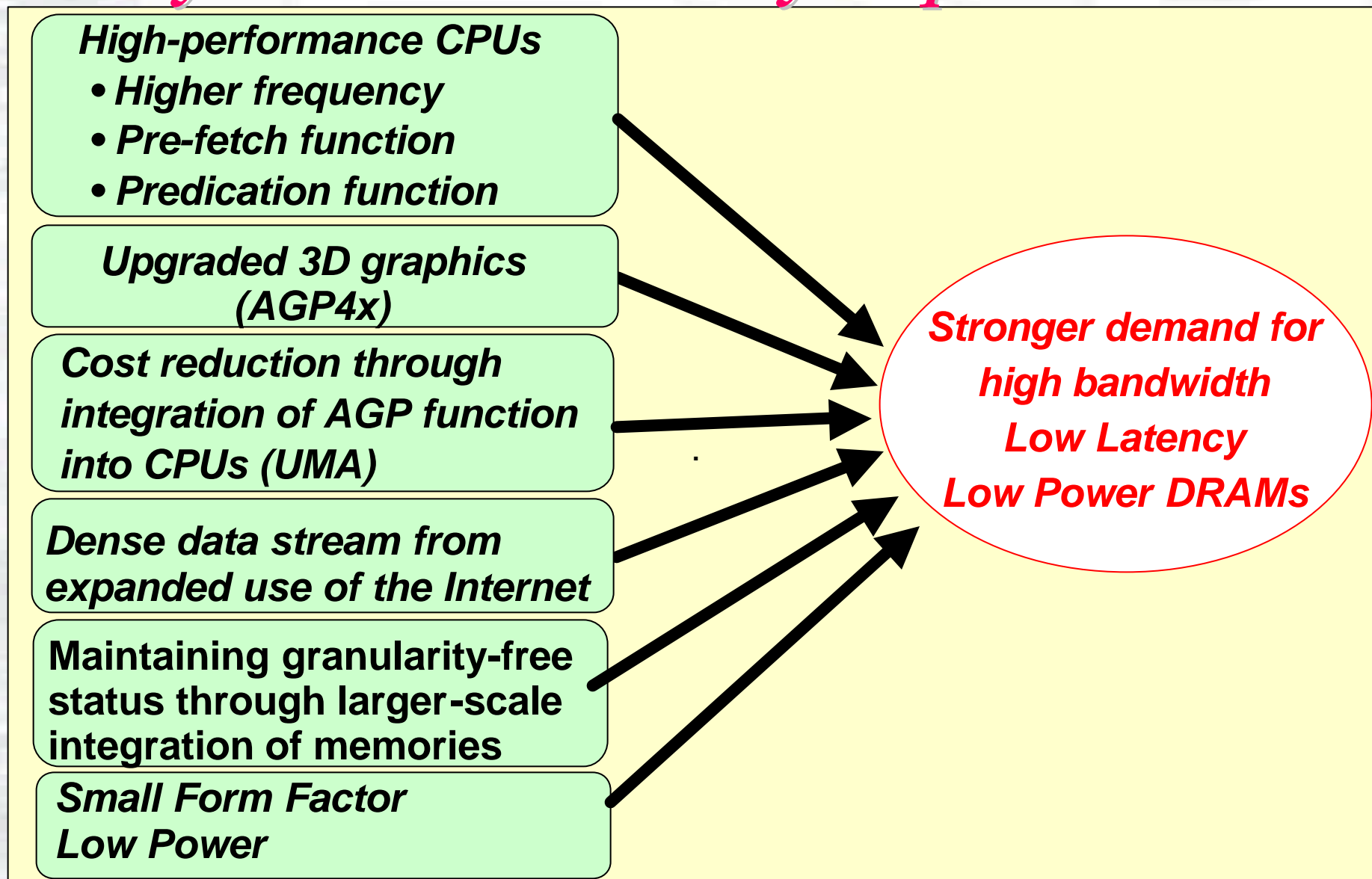


Tomorrow's Infrastructure

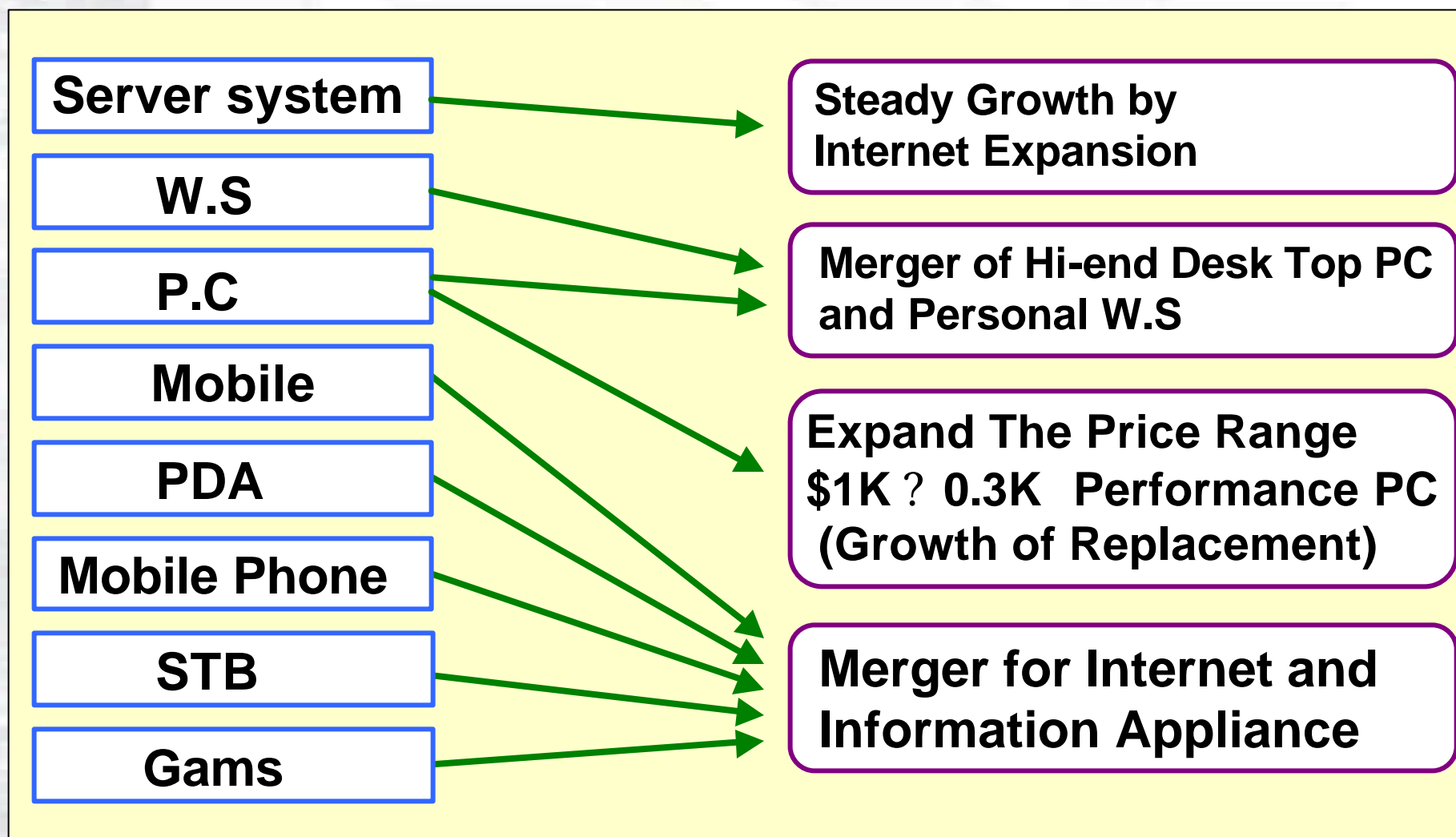
Diverse Hardware Form Factors & Roles



System-Based Memory Requirements



Memory System Trend



Emerging Software Applications

Stimulated By Need to Communicate Effectively & Efficiently

- Business Intelligence
- ERP
- Supply Chain Management
- OLTP
- E-Commerce
- Message Transactions
- Caching
- Streaming Media
- 3D Animation & Rendering
- Video Editing & Composition
- Voice Recognition

Memory System Requirements

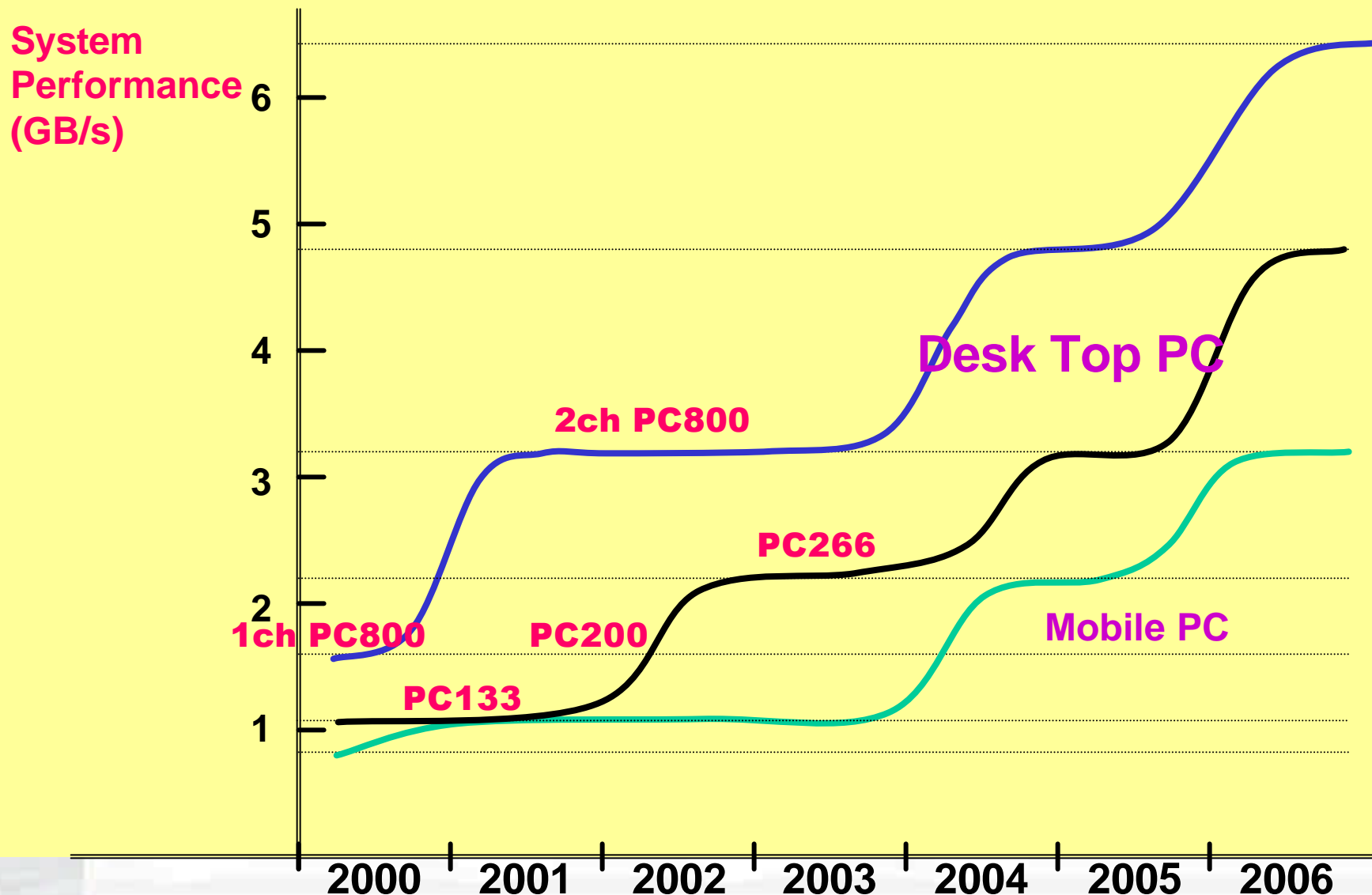
For Tomorrow's Systems and Applications

DRAM Technology Improvements

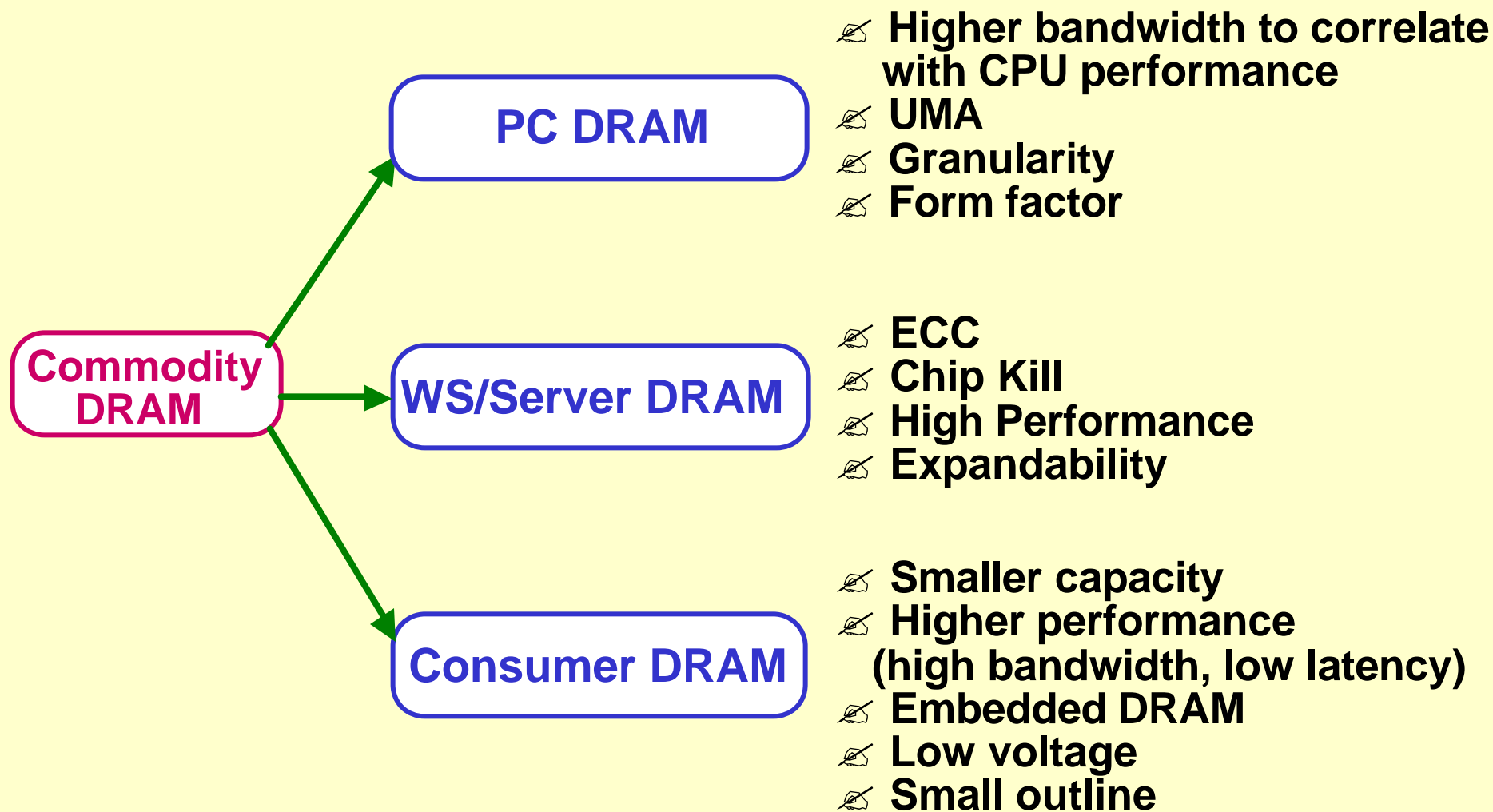
- Higher Density
 - 128Mbit to 2Gbit
- Higher Bandwidth (speed)
 - 1GB/s to 10+GB/s
- Lower Latency & Power
 - 3.3V to 1V
- Special Form Factors
 - Stacked packaging, LP DIMMs, etc.

Photo Source: West Japan Railway Company

PC System Performance Movement

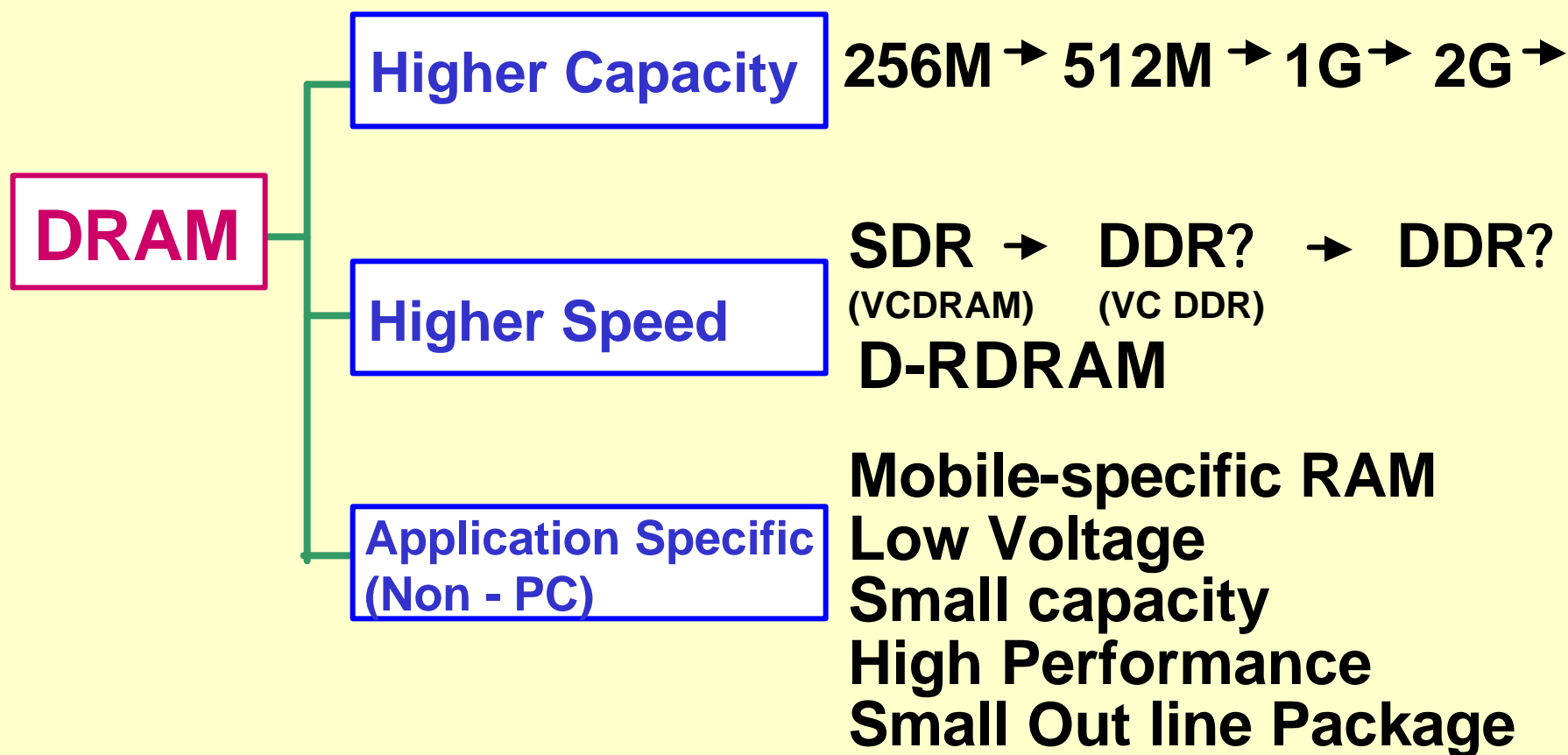


DRAM Variation

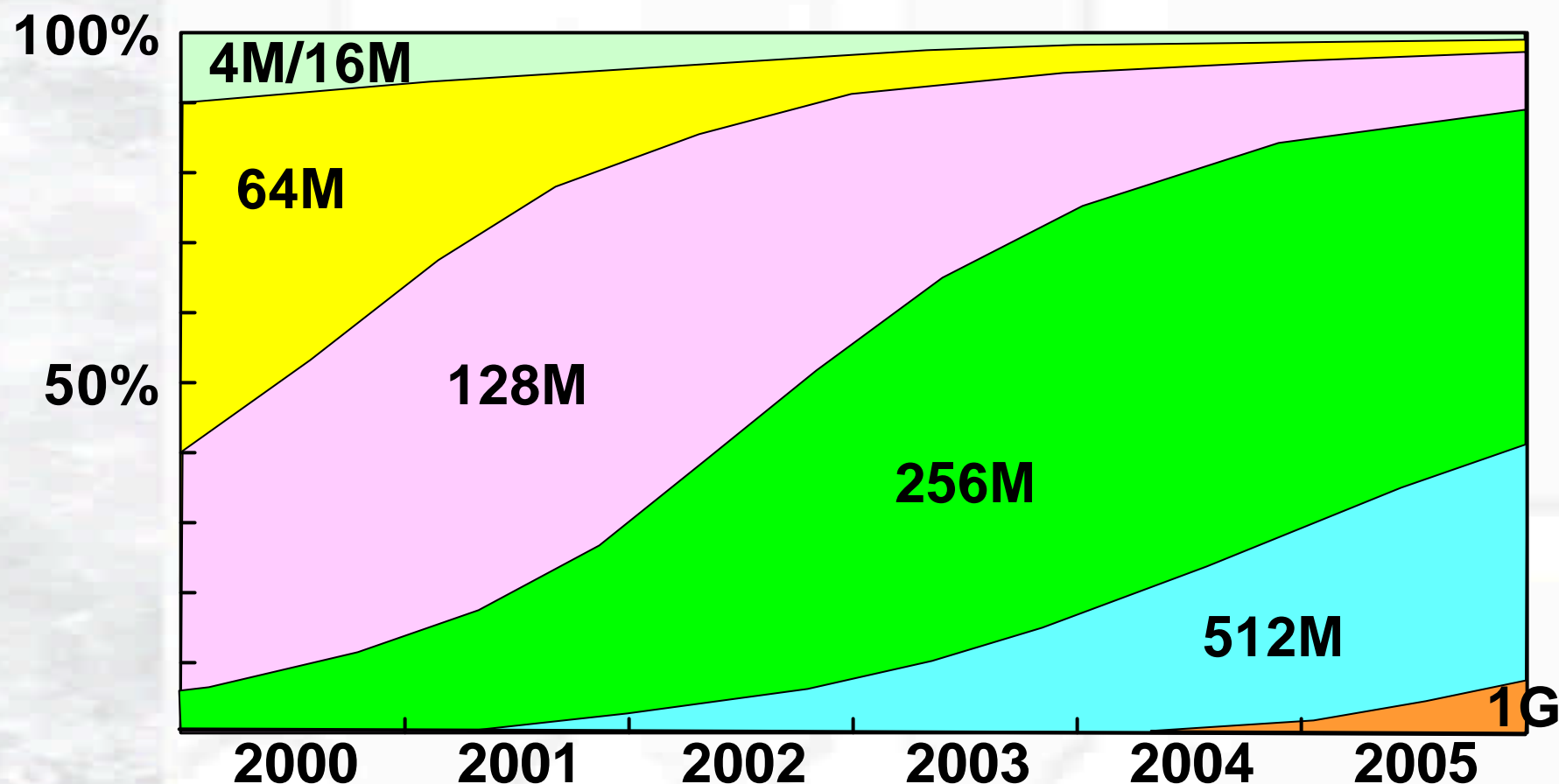


Future DRAM Development

DRAM Technology Migration



Product Mix Forecast (Density)

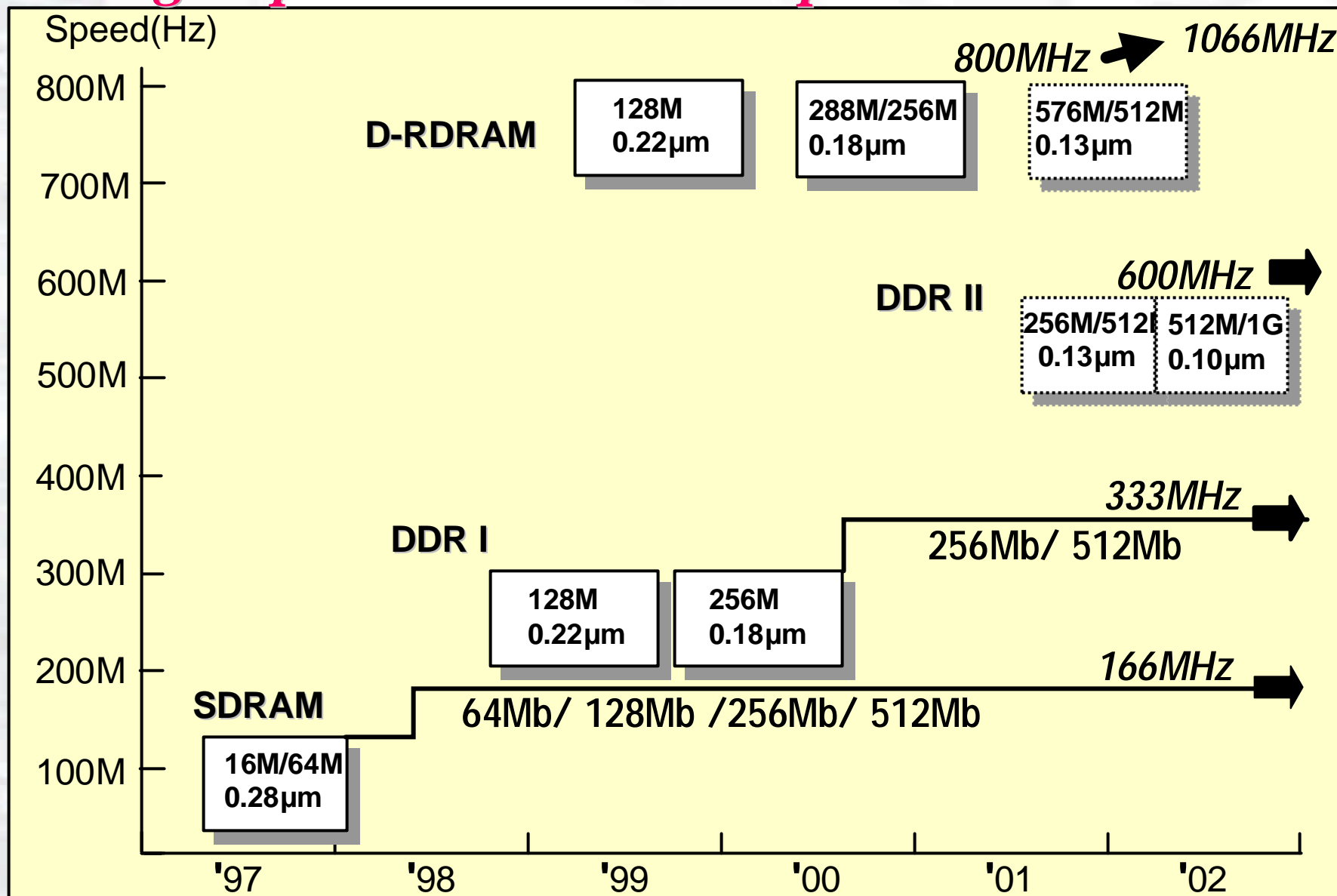


DRAM Power Supply

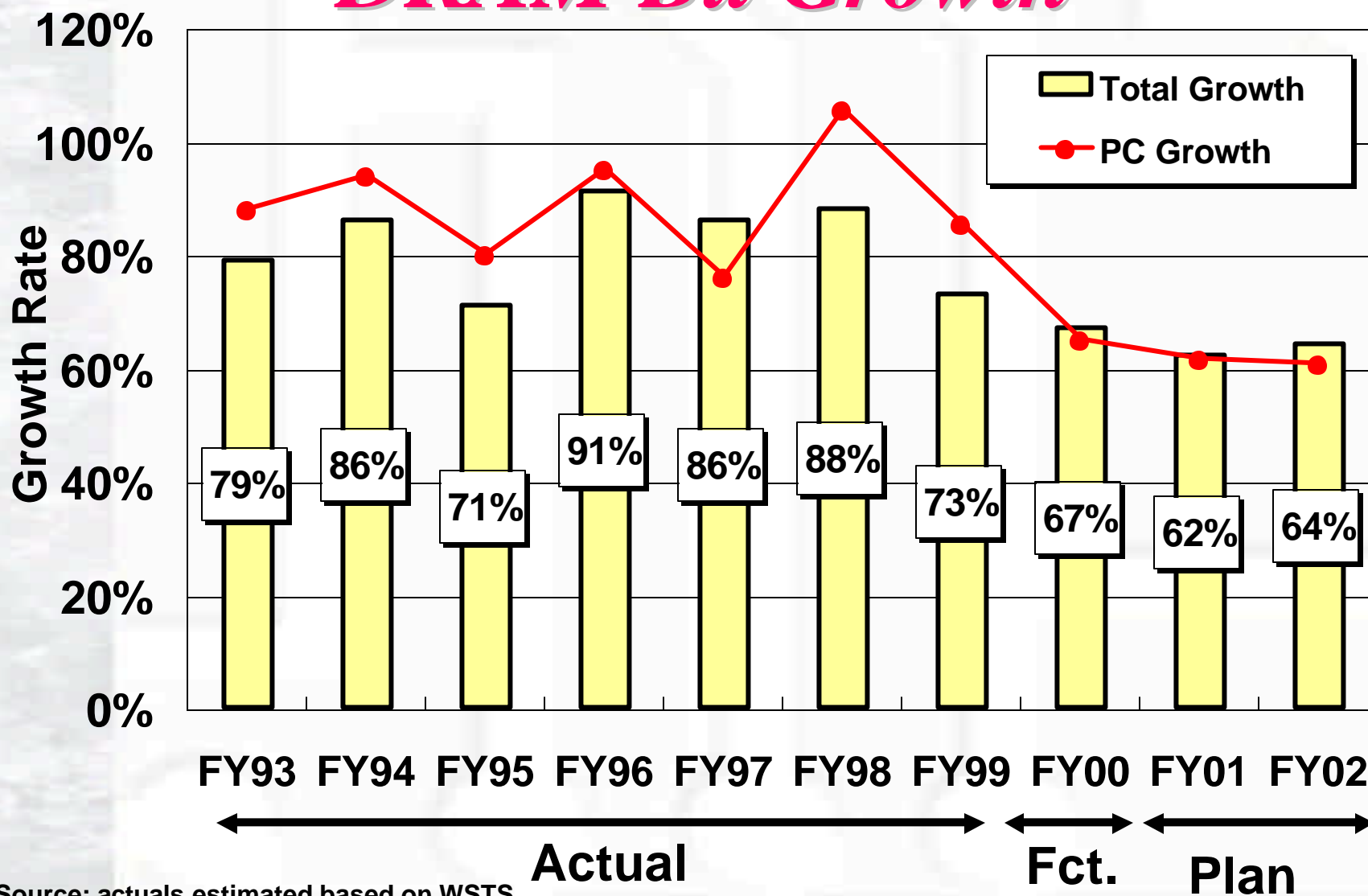
	64M	128M	256M	512M
EDO/FP	3.3V	————	————	————
SDRAM	3.3V	3.3V	3.3V	3.3V
DDR SDRAM	————	2.5V	2.5V	2.5V
DDRII +VC	————	————	2.5V(1.8V)	2.5V(1.8V)
D-Rambus	2.5V	2.5V	2.5V	2.5V

(): Vddq

High Speed DRAM Development Overview



DRAM Bit Growth



Source: actuals estimated based on WSTS

Summary: Elpida's Vision

- **The DRAM market is still growing.....**
 - PC market may be saturated, however new applications are still driving DRAM bit demand
- **Broadband applications require higher performance DRAM**
 - DRAM performance is key to improving system performance
- **Elpida is focused on DRAM innovations**
 - Committed to supporting the major DRAM architectures
 - Improving performance
 - Growing capacity
 - Investment in process technology

Thank You

<http://www.elpida-memory.com>